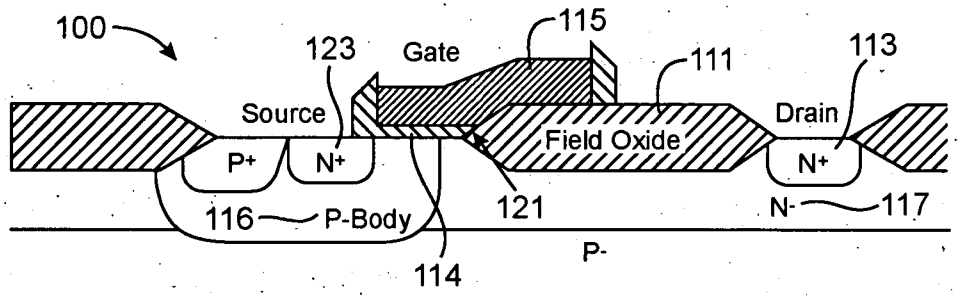
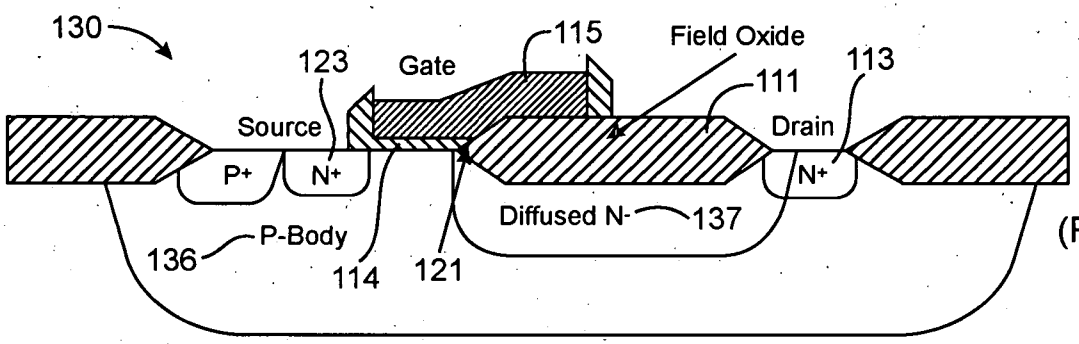


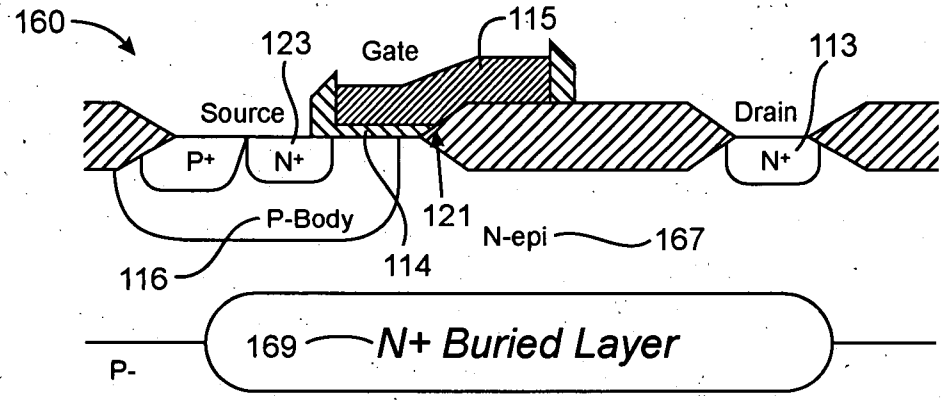
(PRIOR ART)

FIG. 1A



(PRIOR ART)

FIG. 1B



(PRIOR ART)

FIG. 1C

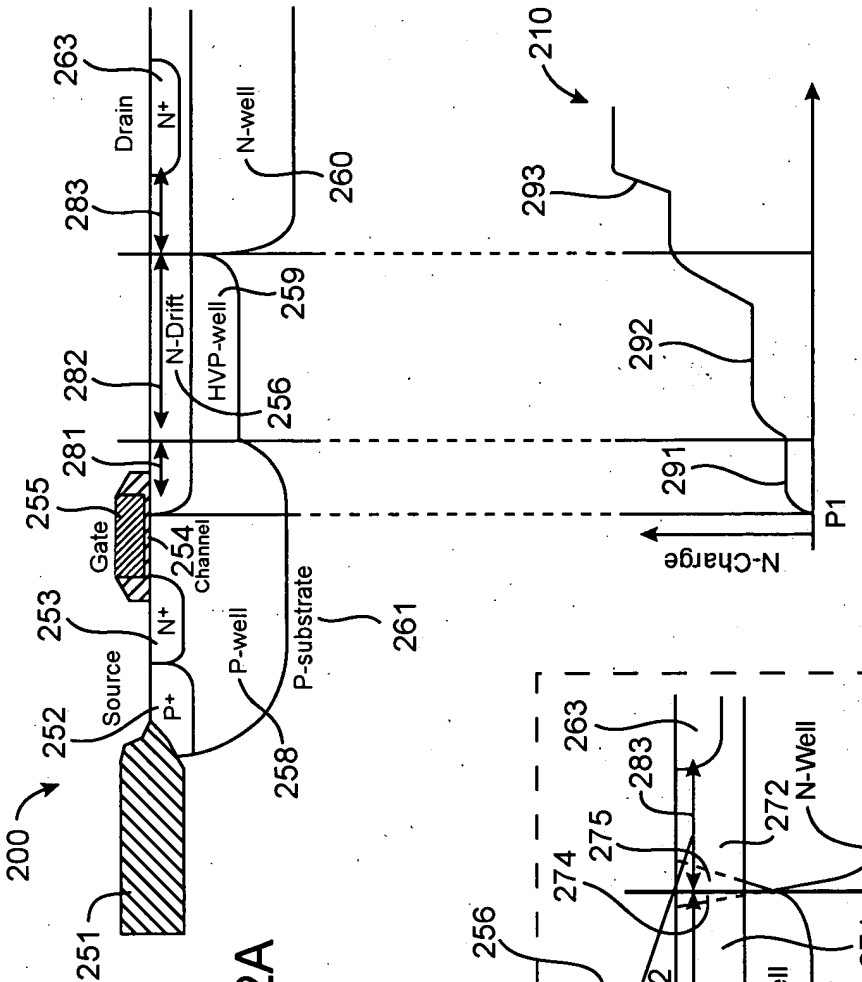

200
251
252
Source
N+
P+
253
254
Channel
Gate
255
281
282
283
N-Drift
HVP-well
256
259
Drain
N+
263
N-well
260
P-well
P-substrate
261
258
210
293
292
291
P1
N-Charge

FIG. 2A

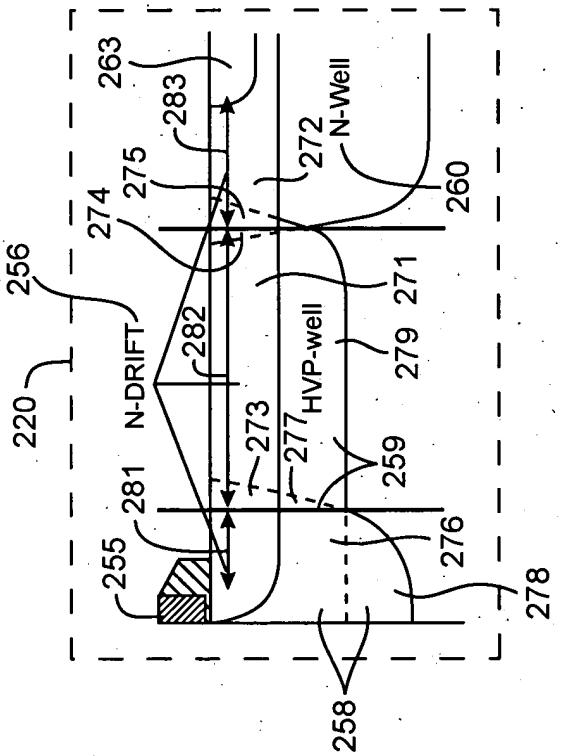

220
256
N-DRIFT
281
255
273
277
HVP-well
279
271
259
276
278
258
274
275
282
283
263
272
N-Well
260

FIG. 2C

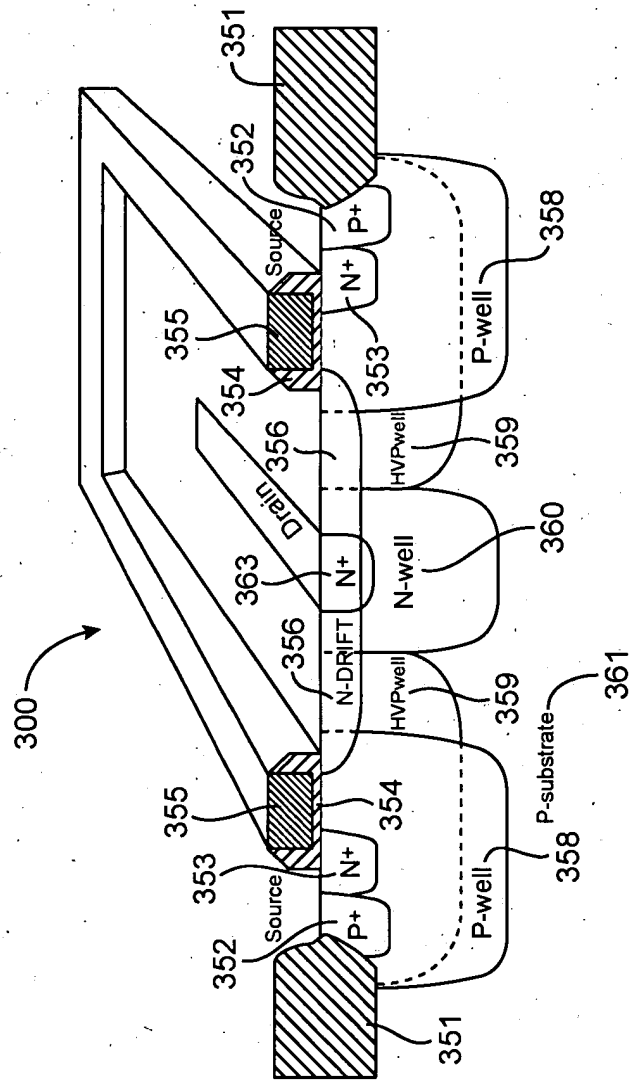

300
351
352
Source
P+
N+
355
353
354
P-well
358
356
HVPwell
359
Drain
363
N-well
360
N-DRIFT
P-substrate
361

FIG. 3

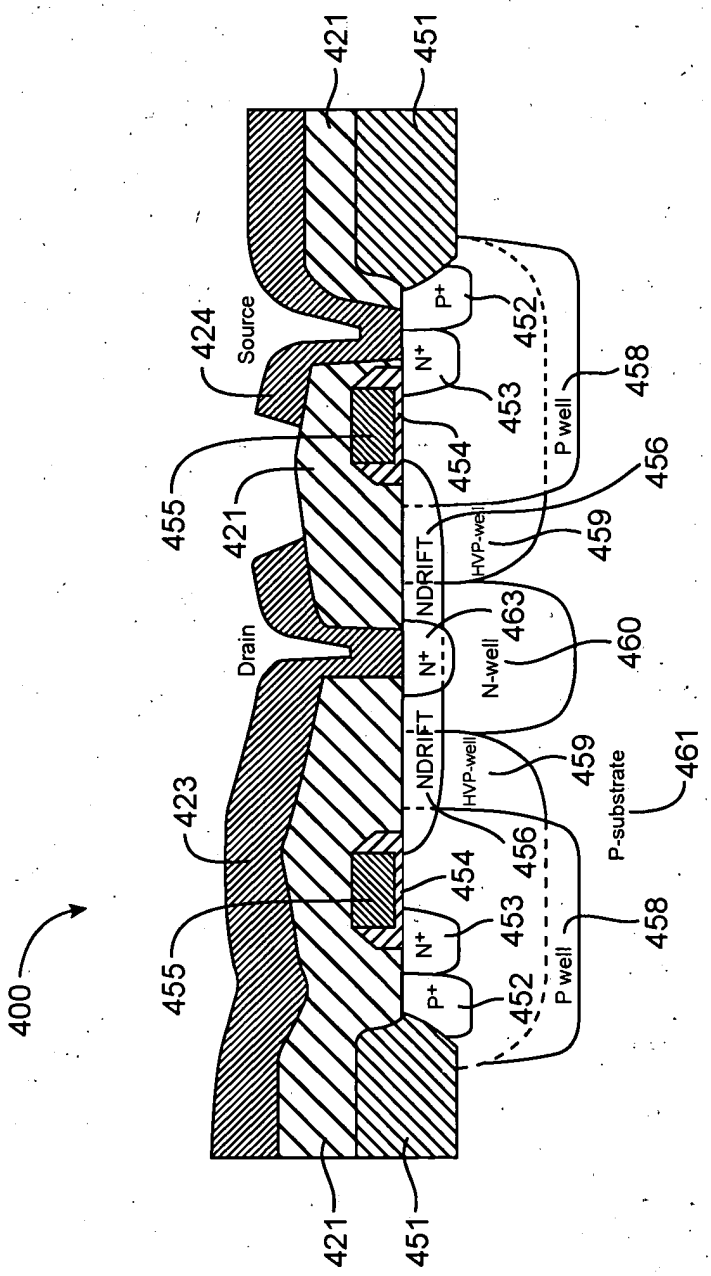

400
421
451
424
Source
455
421
Drain
423
455
421
451
P+
N+
P+
N+
NDRIFT
NDRIFT
N+
452
453
454
456
459
458
461
460
463
P well
HVP-well
N-well
P-substrate

FIG. 4

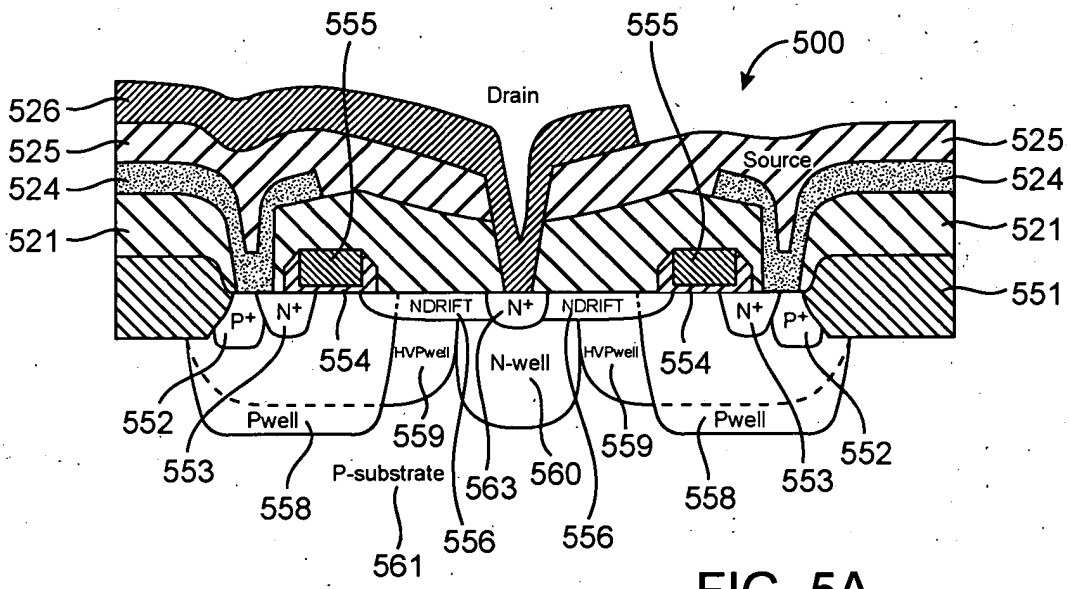

555
555
500
Drain
526
525
524
521
Source
525
524
521
551
P+
N+
NDRIFT
N+
NDRIFT
N+
P+
554
HVPwell
N-well
HVPwell
554
552
Pwell
559
559
Pwell
552
553
P-substrate
563
560
553
558
558
556
556
561

FIG. 5A

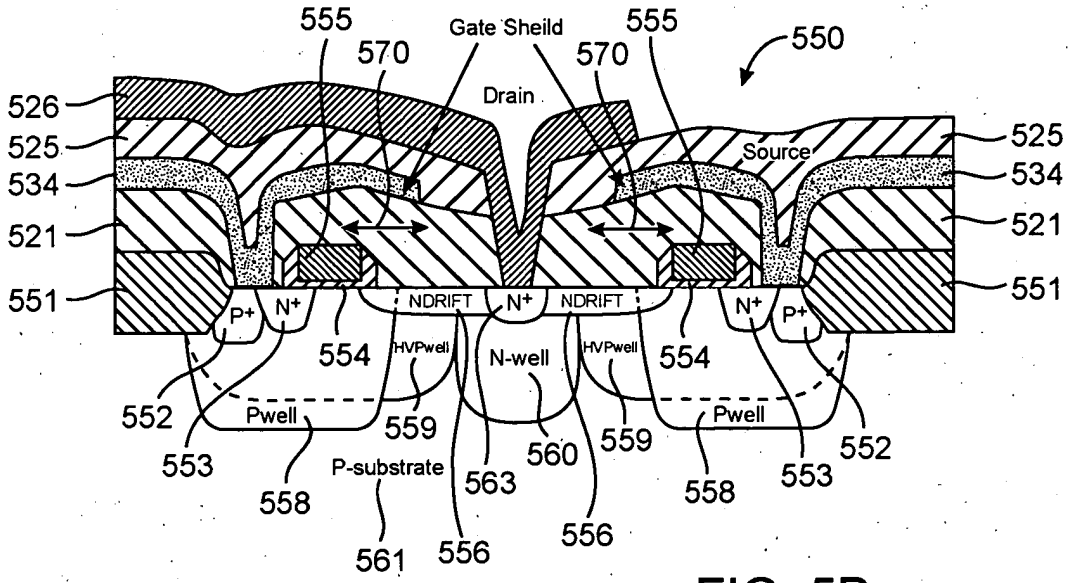

555
570
Gate Sheild
570
555
550
Drain
526
525
534
521
551
Source
525
534
521
551
P+
N+
NDRIFT
N+
NDRIFT
N+
P+
554
HVPwell
N-well
HVPwell
554
552
Pwell
559
559
Pwell
552
553
P-substrate
563
560
553
558
558
556
556
561

FIG. 5B

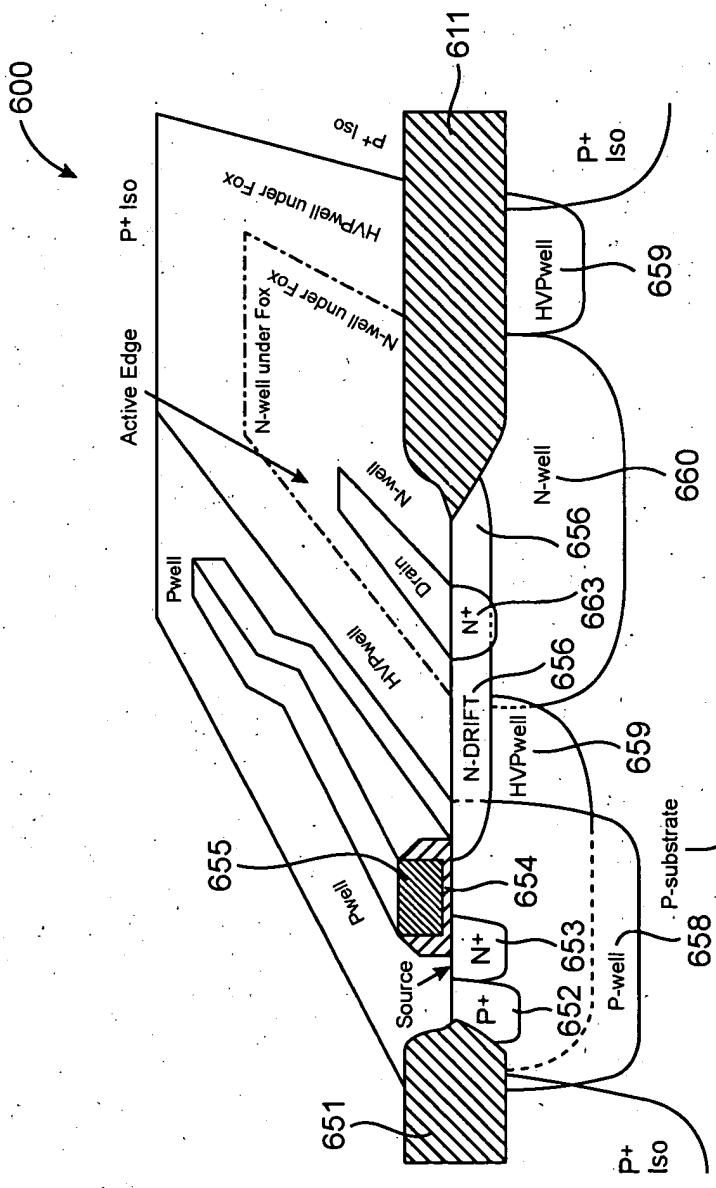

600
611
P+ Iso
HV/Pwell under Fox
N-well under Fox
Active Edge
N-well under Fox
N-well
Drain
Pwell
HV/Pwell
N+
N-DRIFT
HVPwell
Pwell
Source
N+
P+
P-well
P-substrate
P+ Iso
P+ Iso
HVPwell
N-well
655
654
653
652
651
656
663
656
659
660
659
661
658

FIG. 6

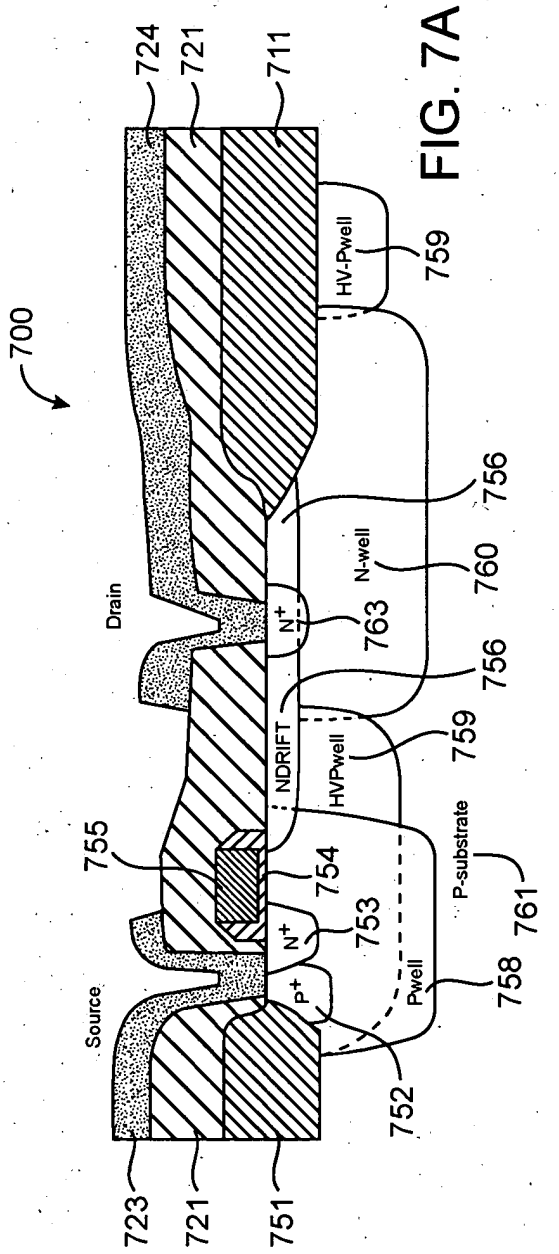

700
724
721
711
HV-Pwell
759
Drain
N-well
760
756
763
N+
NDRIFT
HVPwell
759
756
755
754
753
N+
P+
Pwell
P-substrate
761
758
752
Source
723
721
751

FIG. 7A

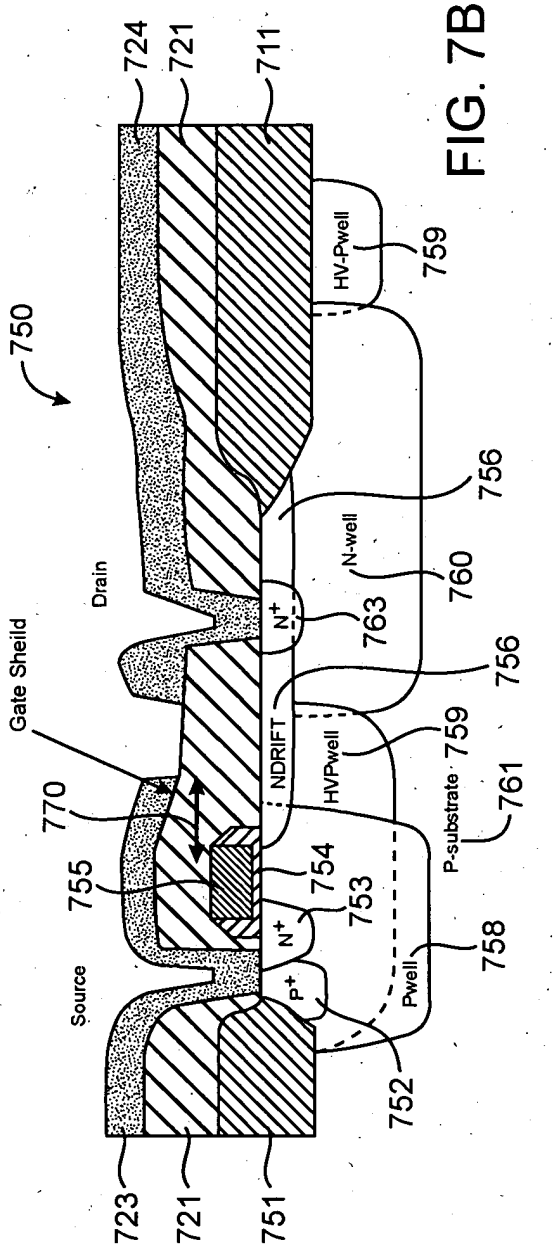

750
724
721
711
HV-Pwell
759
Drain
N-well
760
756
763
N+
Gate Sheild
770
NDRIFT
HVPwell
759
756
755
754
753
N+
P+
Pwell
P-substrate
761
758
752
Source
723
721
751

FIG. 7B

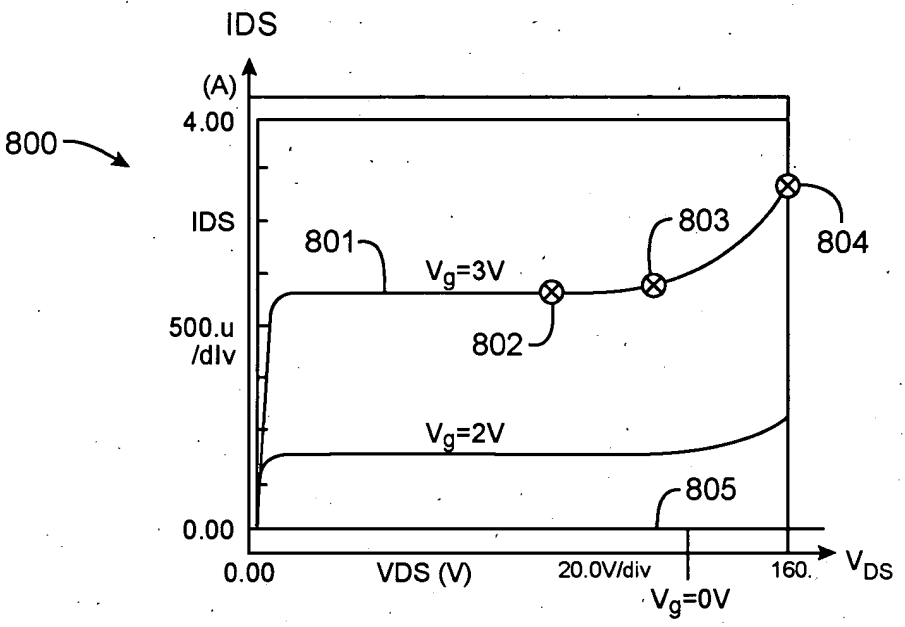

IDS
(A)
4.00
IDS
500.u
/dIv
0.00
800
801
802
803
804
805
V_g=3V
V_g=2V
V_g=0V
0.00
VDS (V)
20.0V/div
160.
V_{DS}

FIG. 8

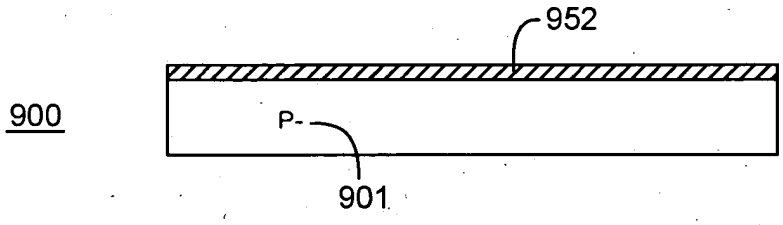


FIG. 9A

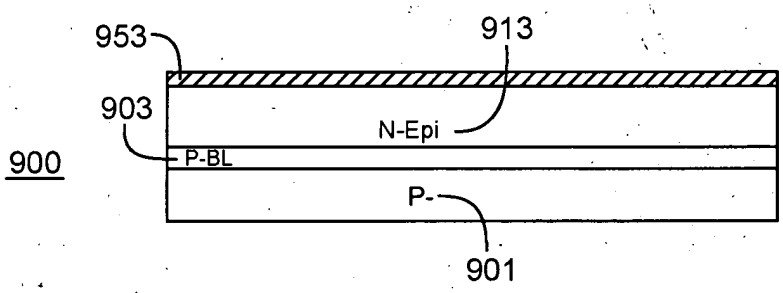


FIG. 9B

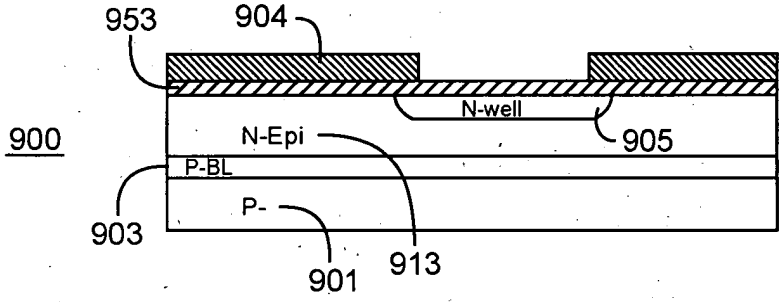


FIG. 9C

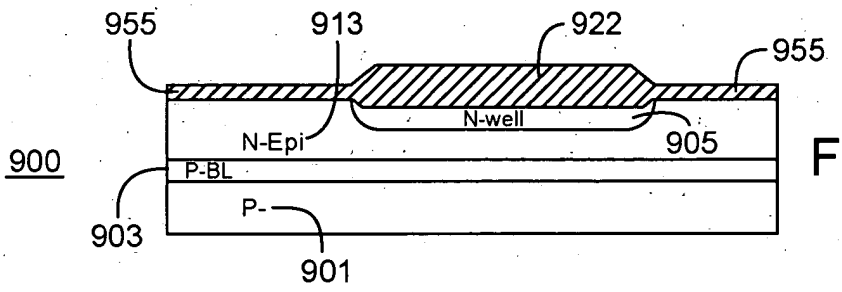


FIG. 9D

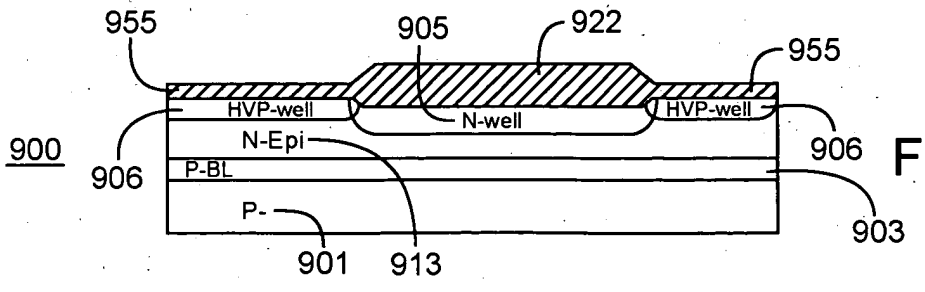


FIG. 9E

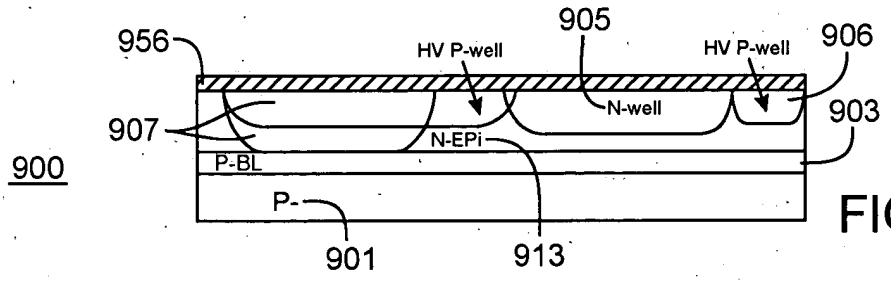


FIG. 9F

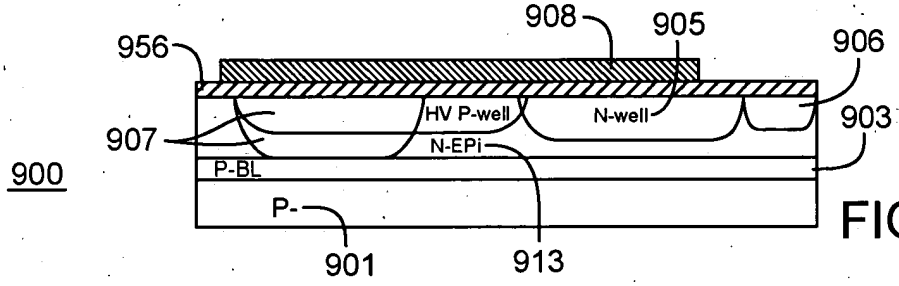


FIG. 9G

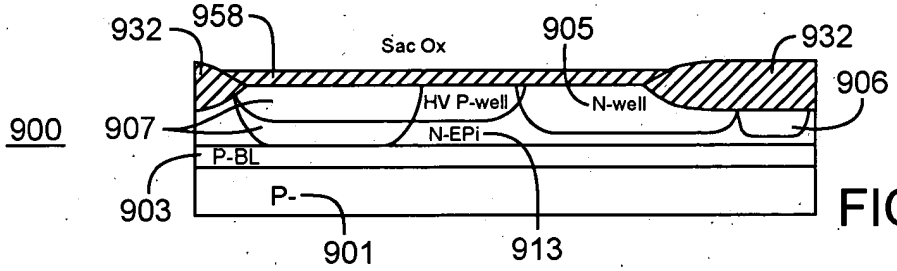


FIG. 9H

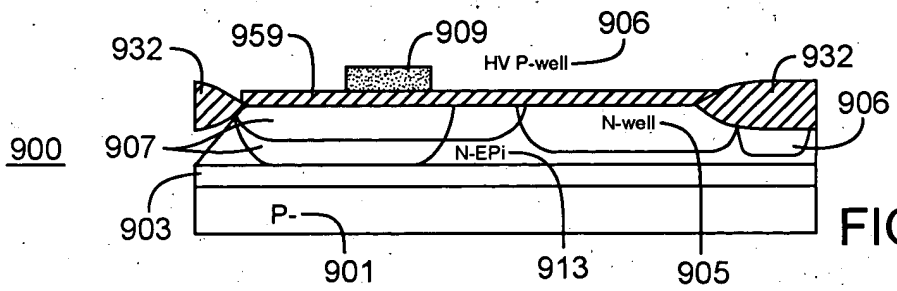


FIG. 9I

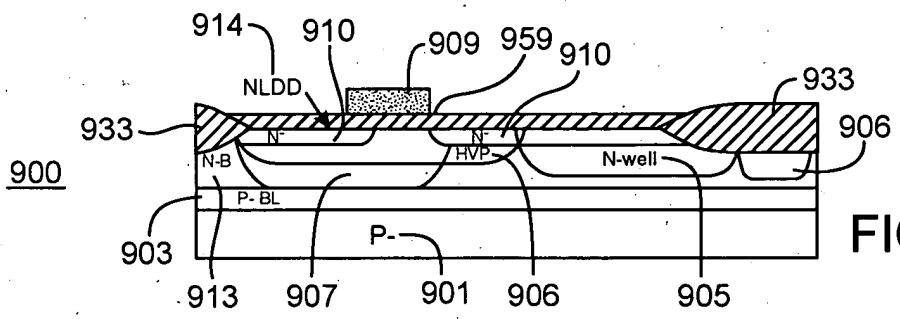


FIG. 9J

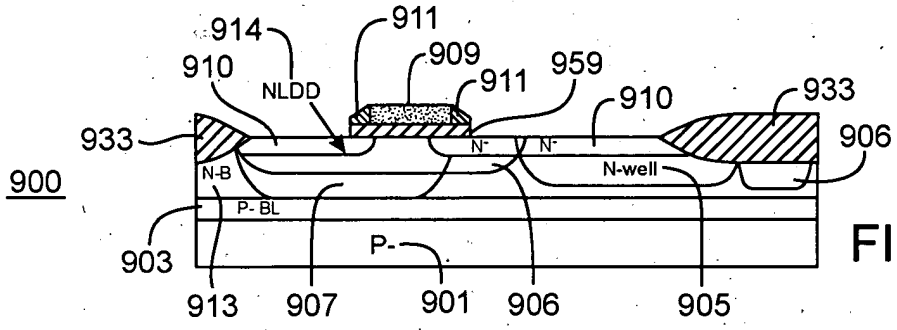


FIG. 9K

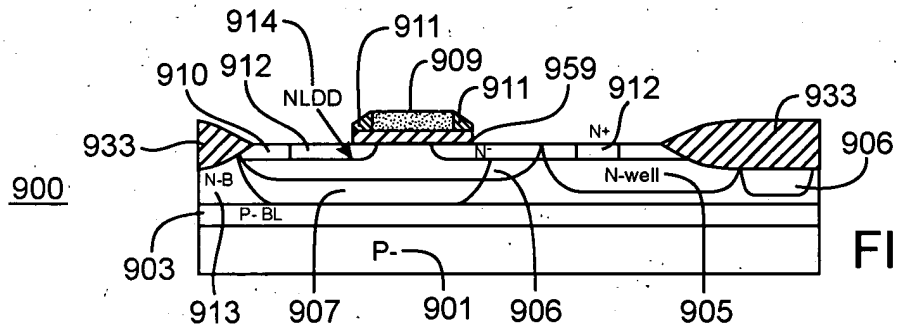


FIG. 9L

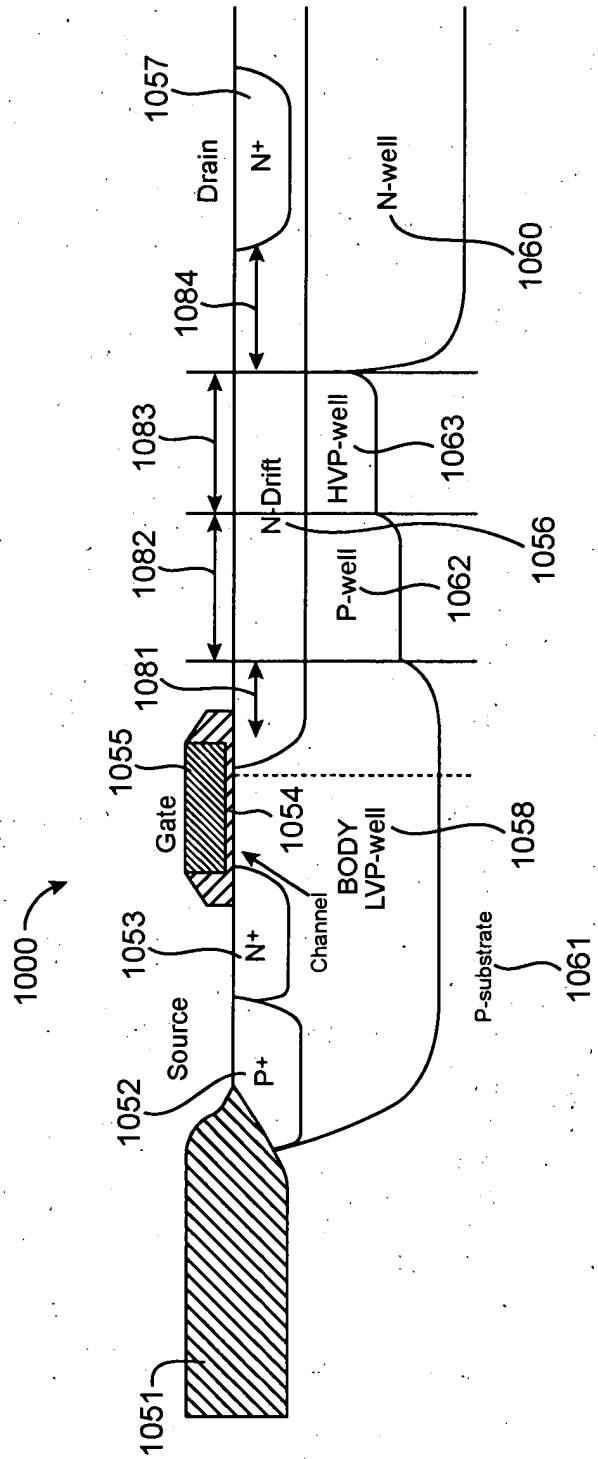

1000
1051
1052
Source
P+
1053
N+
Channel
1054
Gate
1055
1081
1082
1083
1084
1057
Drain
N+
N-Drift
1056
BODY
LVP-well
1058
P-well
1062
HVP-well
1063
N-well
1060
P-substrate
1061

FIG. 10

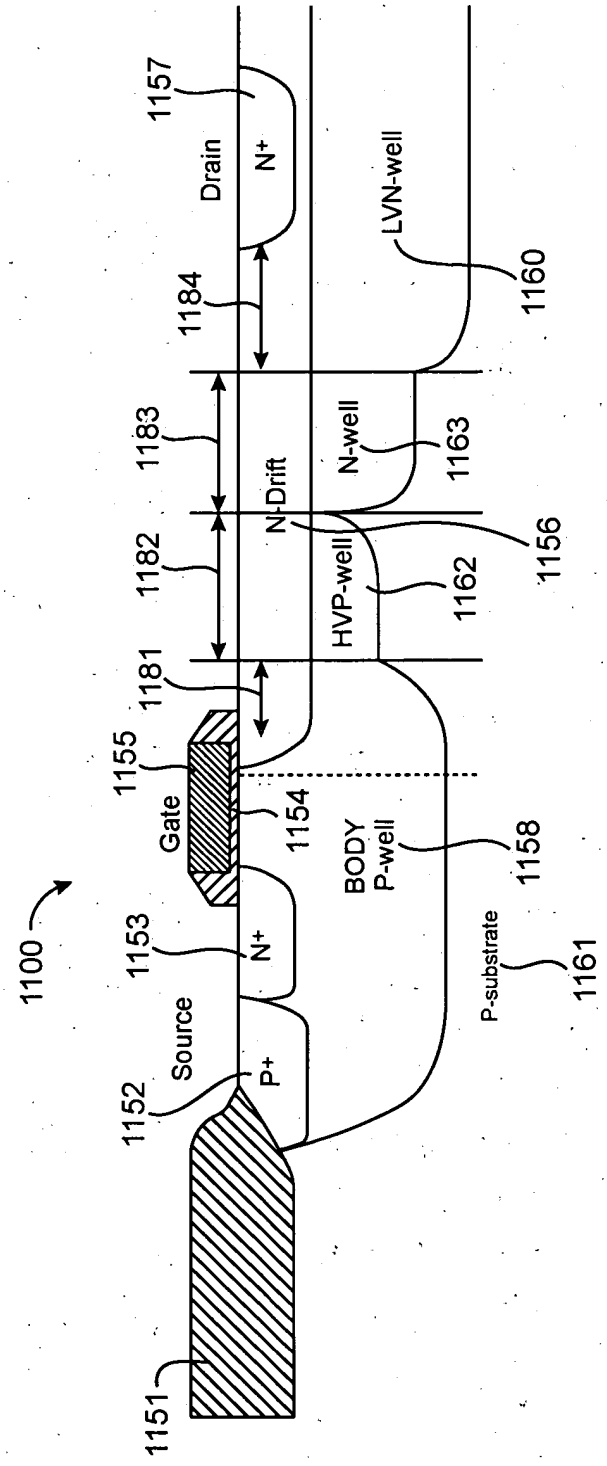

1100
1151
1152
Source
P+
1153
N+
1154
Gate
1155
1156
1157
Drain
N+
1158
BODY
P-well
1160
LVN-well
1161
P-substrate
1162
HVP-well
1163
N-well
N-Drift
1181
1182
1183
1184

FIG. 11

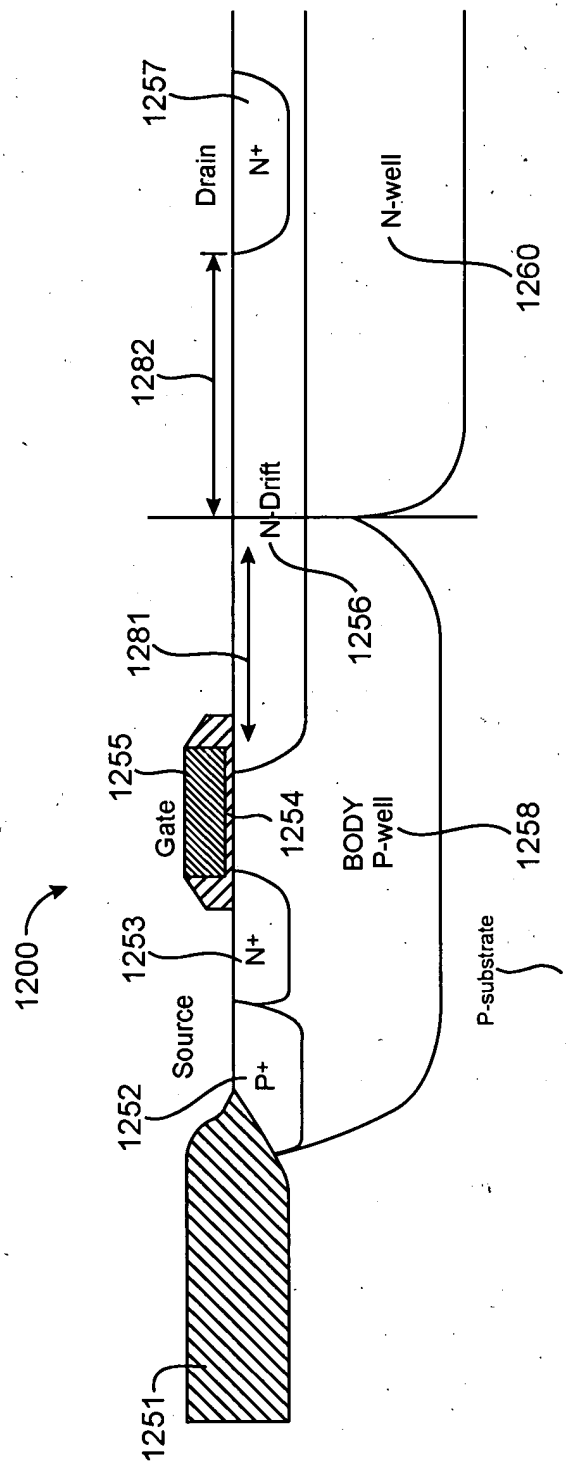

1200
1251
1252
Source
P+
1253
N+
1254
Gate
1255
1256
N-Drift
1257
Drain
N+
1258
BODY
P-well
1260
N-well
1261
P-substrate
1281
1282

FIG. 12

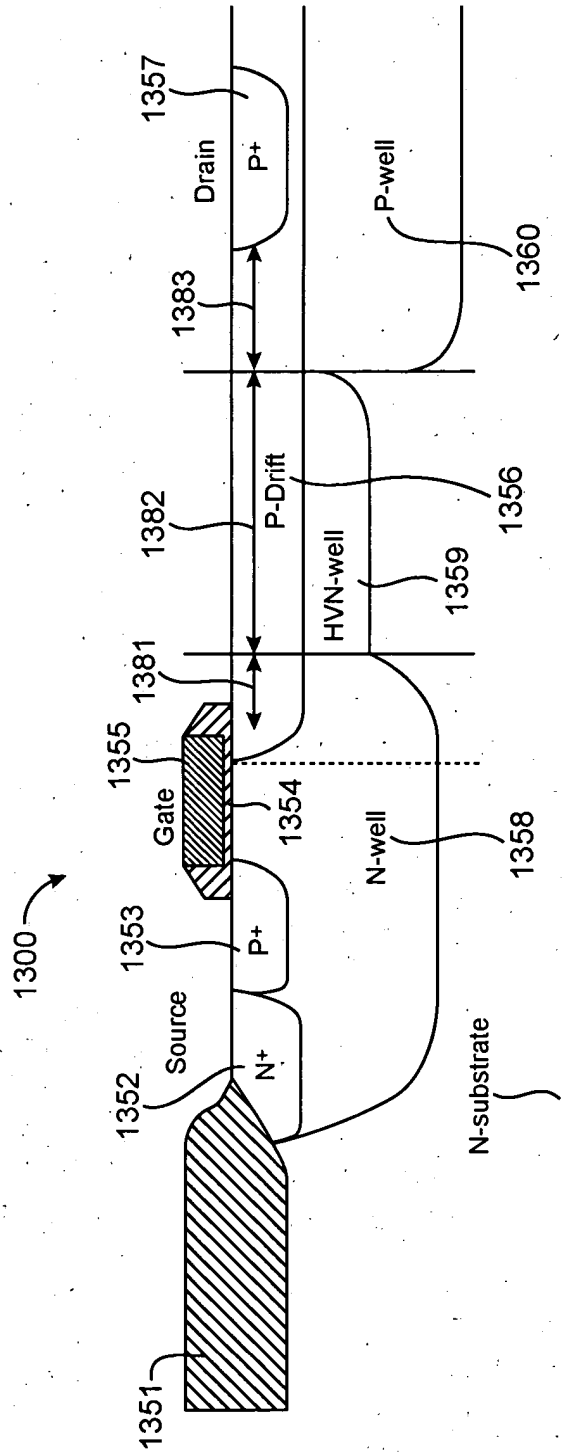

1300
1351
1352
Source
N+
1353
P+
1354
Gate
1355
1381
1382
P-Drift
1383
Drain
P+
1357
1356
HVN-well
1359
N-well
1358
P-well
1360
N-substrate
1361

FIG. 13

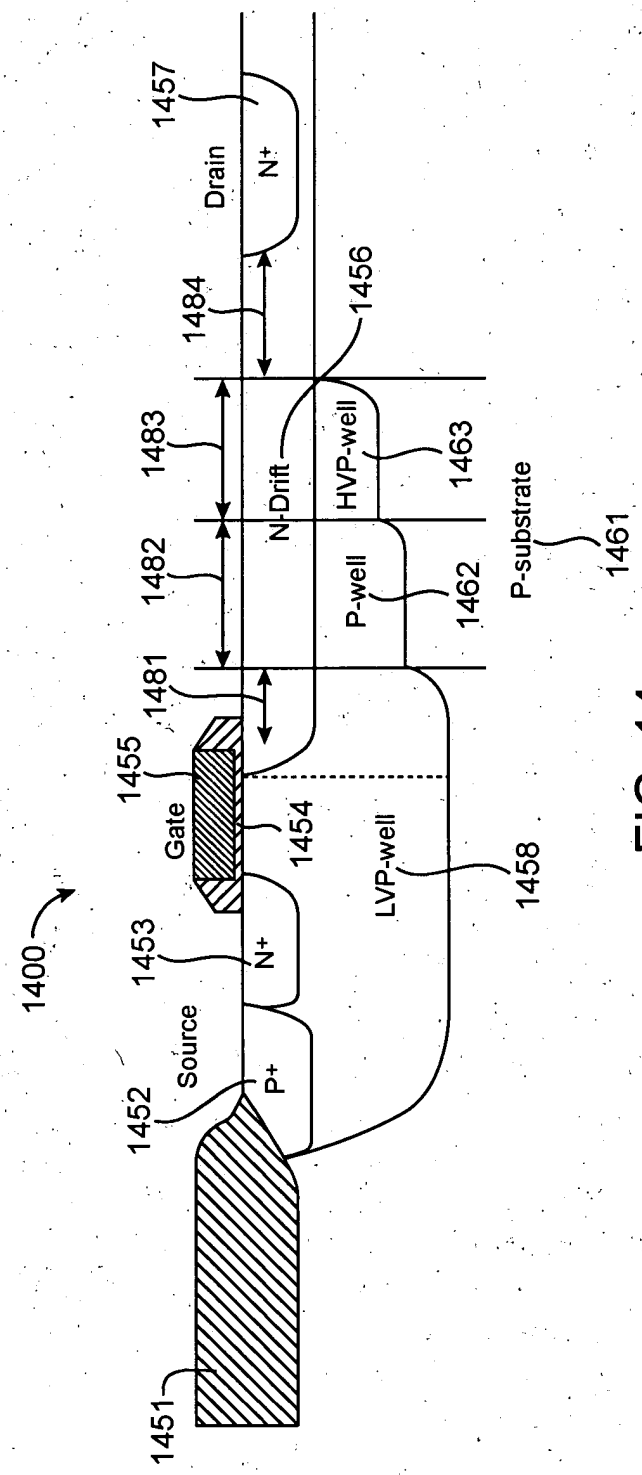

1400
1451
1452
Source
P+
1453
N+
1454
Gate
1455
1481
1482
1483
1484
1457
Drain
N+
1456
N-Drift
HVP-well
1463
P-well
1462
P-substrate
1461
LVP-well
1458

FIG. 14